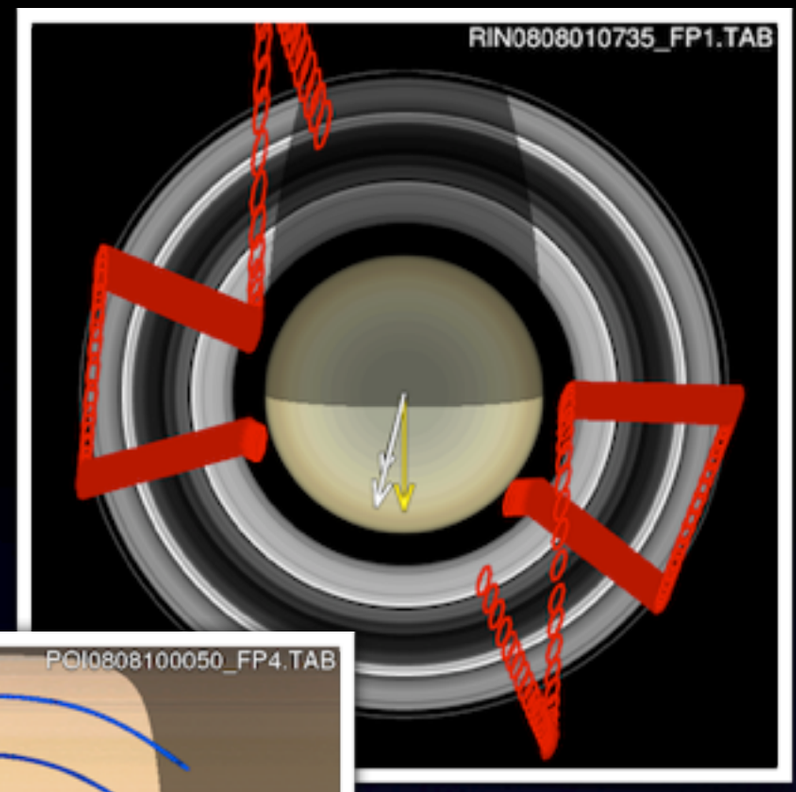
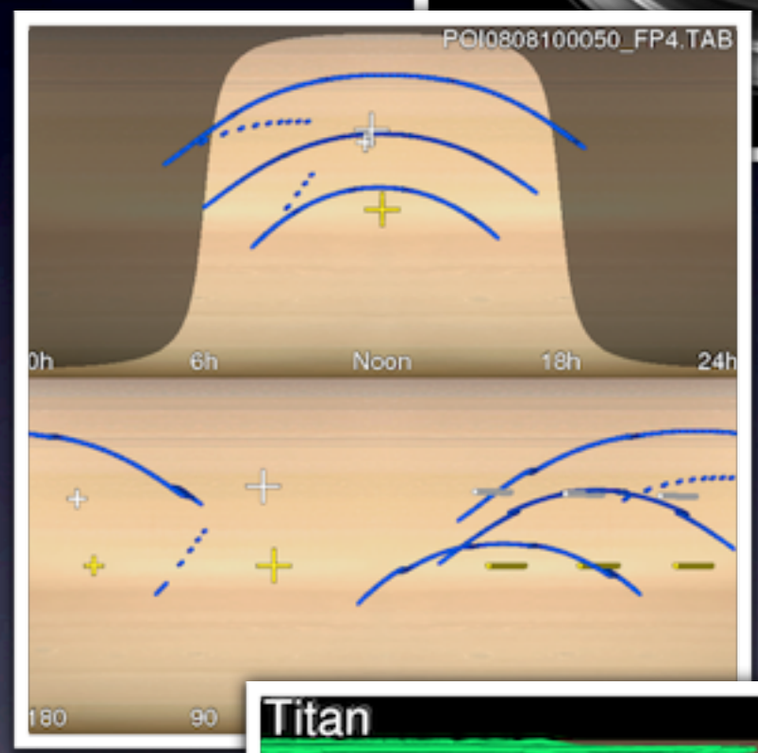
Rings Node Report

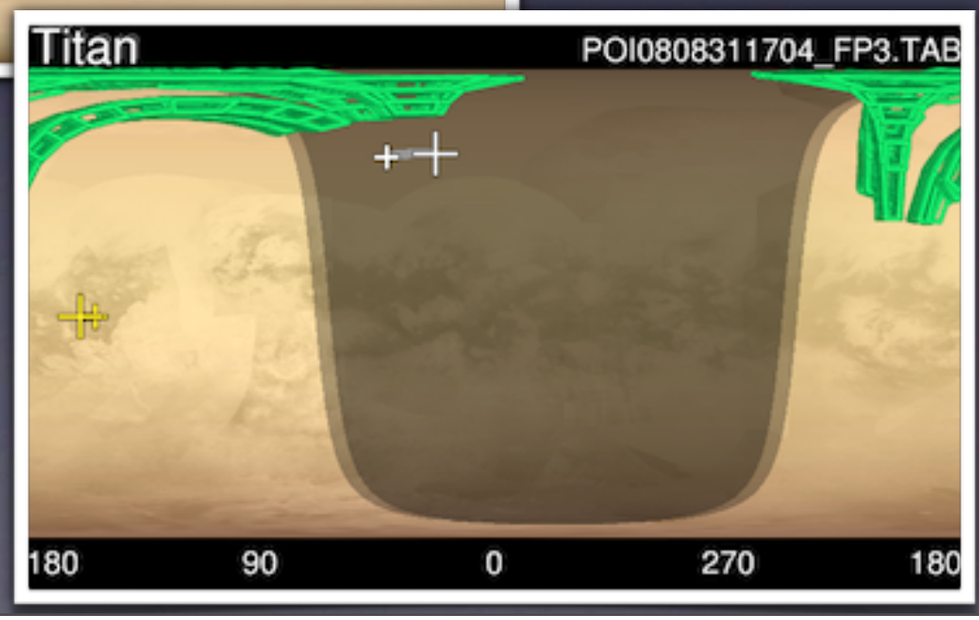
Mark Showalter & Mitch Gordon
PDS Management Council Meeting
Washington, DC
March 25, 2010

Cassini CIRS Re-formatting

- Pipeline rebuilt to satisfy liens.
- New diagrams generated.
- Entire data set regenerated from COCIRS 2.0.
- The review panel missed a few things...
  - E.g., each spectrum now includes an indication of whether the shutter was open or not!







Cassini CIRS Re-formatting

Lessons Learned

- Get the team to do it right the first time.

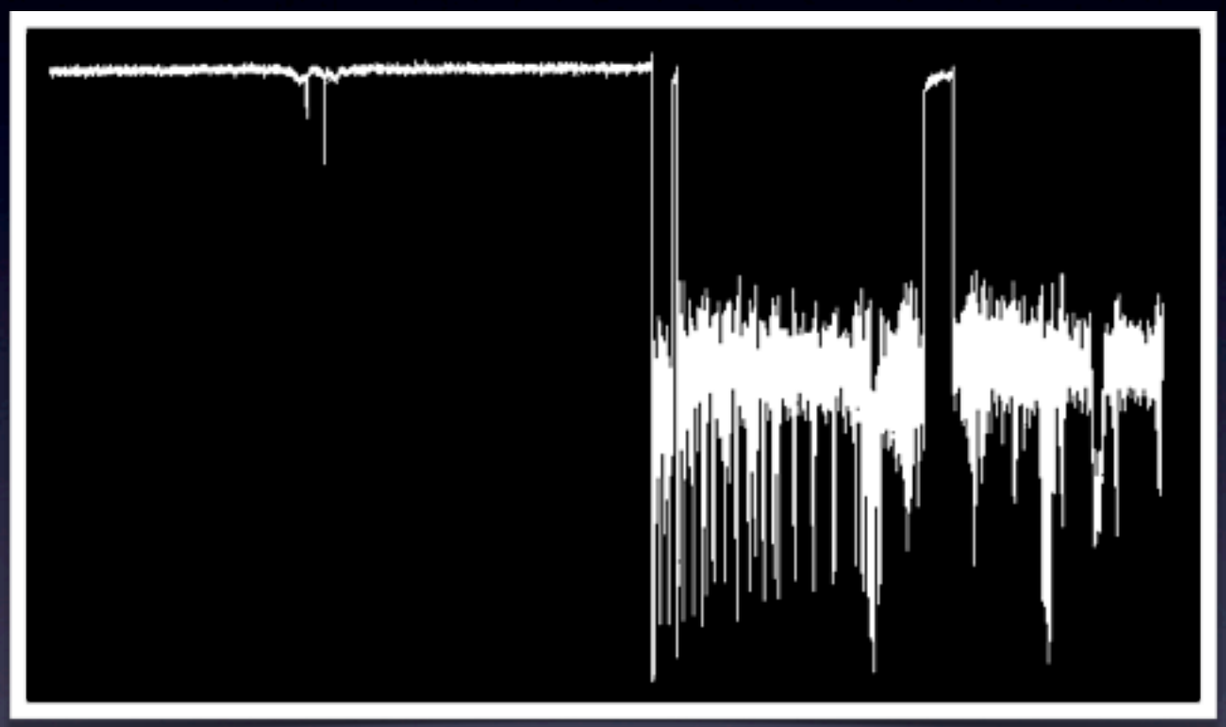
Cassini CIRS Re-formatting

Lessons Learned

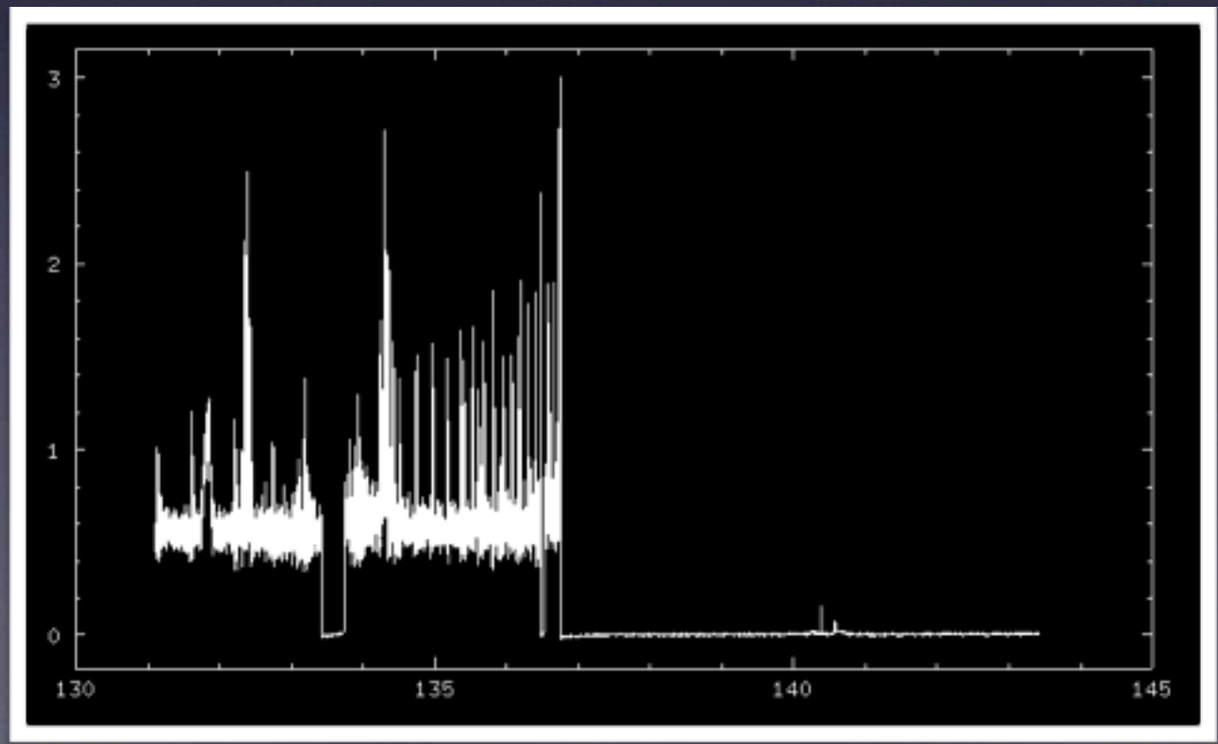
- Get the team to do it right the first time.
  - This is way easier said than done.

Cassini UVIS Occultations

Supported by CDAP funding to Josh Colwell



Uncalibrated:
Photon counts vs. time,
binary formats



Calibrated:
Optical depth vs. radius,
ASCII formats

HST (Re-Re-) Archiving

- Our Original Goals:
  - Fully integrate HST data into OPUS.
    - Mainly images of outer planets.
  - Let users download HST data directly from an OPUS search.
  - Produce usable, PDS-compliant, complete metadata and indices.

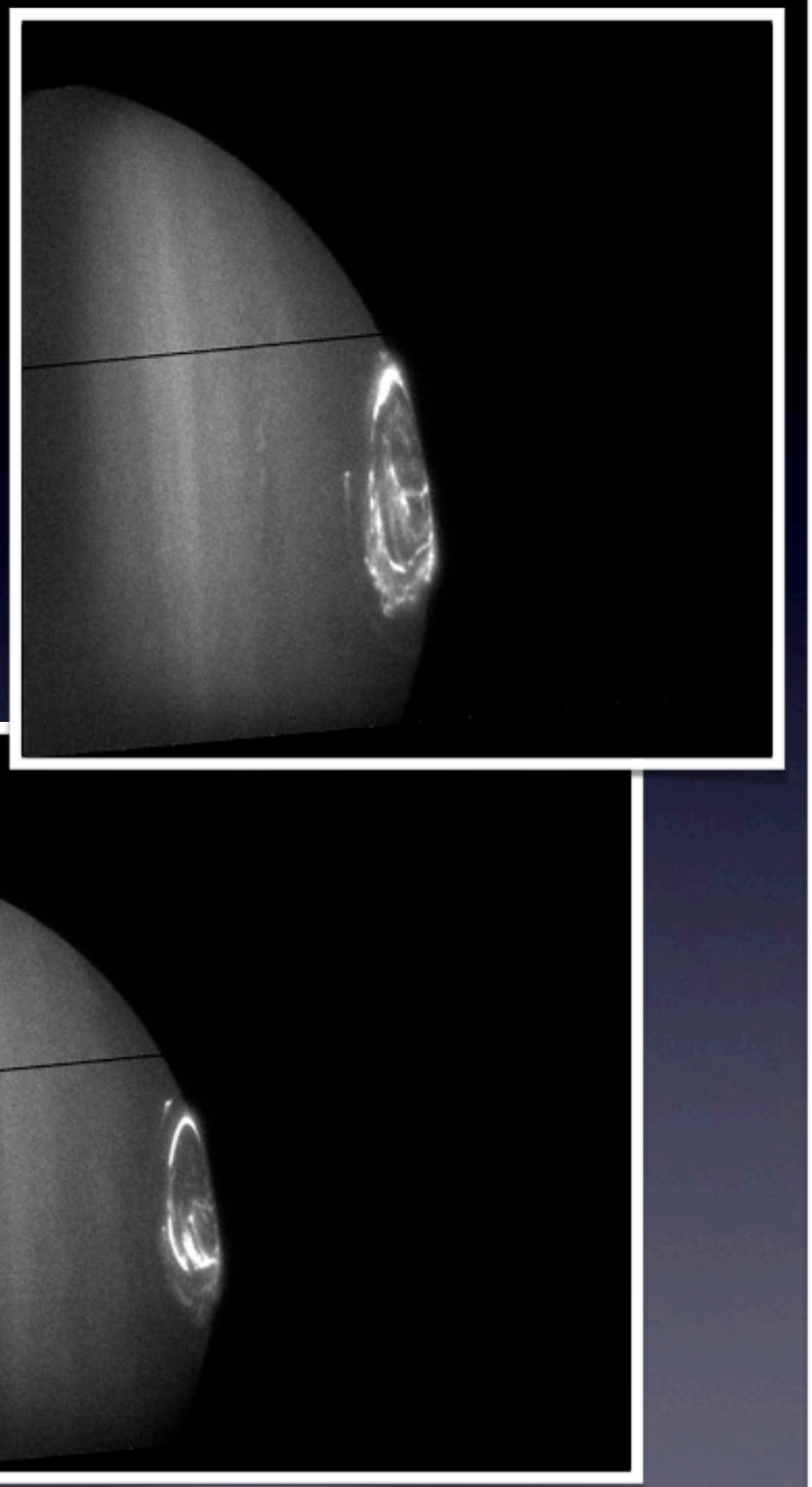
HST (Re-Re-) Archiving

- The Problem:
  - STScI revised every data product before we finished.
  - STScI updates their calibration pipeline and file formats whenever they like, without warning.

HST (Re-Re-) Archiving

- Our ~~Original~~ *Revised* Goals:
  - ~~Fully~~ *Partially* integrate HST data into OPUS.
  - Let users ~~download~~ *preview* HST data directly from an OPUS search.

    ... and provide instructions on how to request the data from STScI.
  - Produce usable, PDS-compliant *nearly* complete metadata and indices.



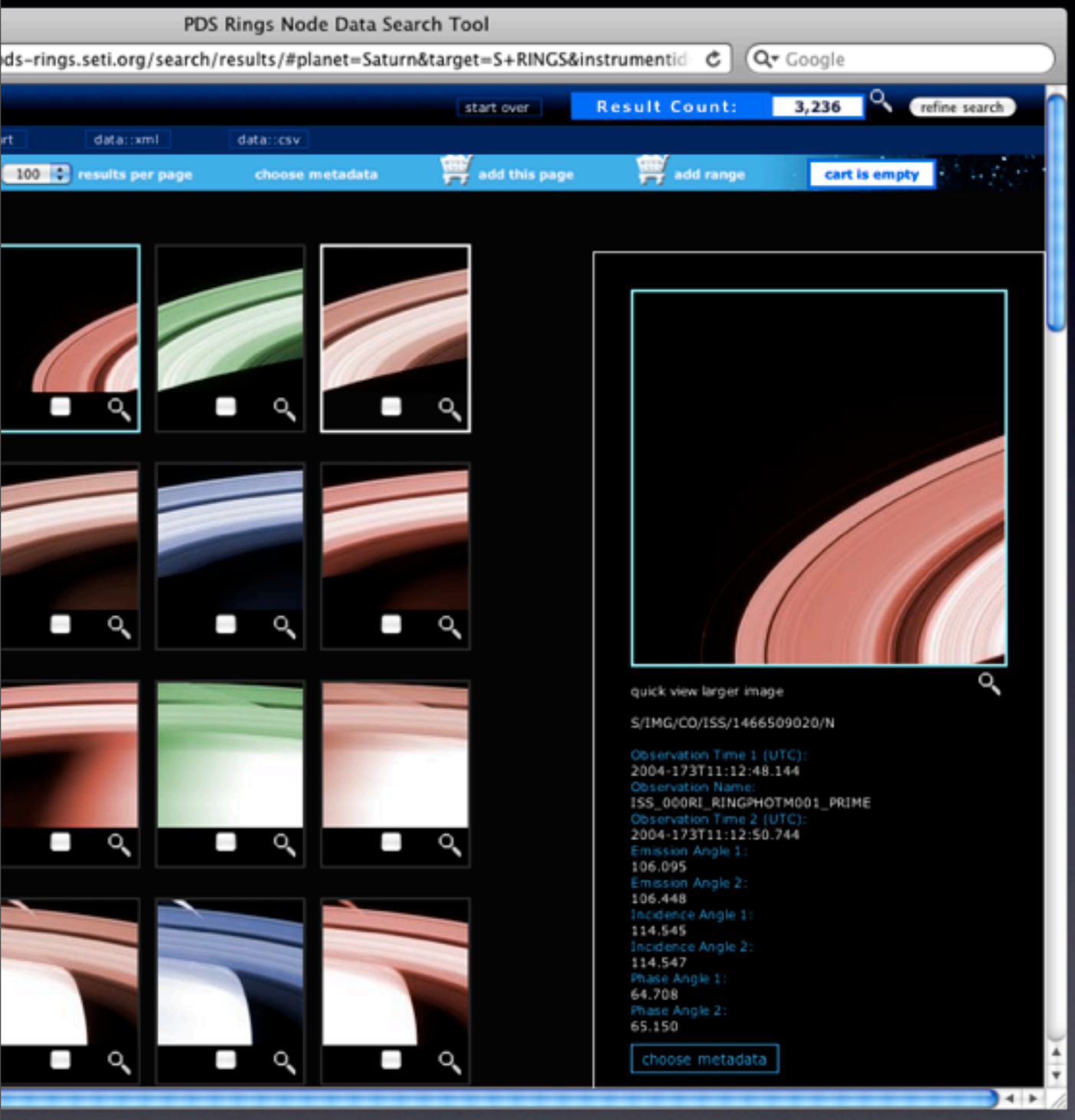
```
/*******************************************************************************
/*******************************************************************************
fitsfile= 'J9DU03B3Q_DRZ.FITS' / name of file from the STScI archive
headerno=                    1 / header number in file, starting at 1
recordno=                    1 / record number in file, starting at 1
/*******************************************************************************

SIMPLE  =                    T / conforms to FITS standard
BITPIX  =                    8 / array data type
NAXIS   =                    0 / number of array dimensions
EXTEND  =                    T
ORIGIN  = 'NOAO-IRAF FITS Image Kernel July 2003' / FITS file originator
IRAF-TLM= '21:12:50 (25/09/2009)' / Time of last modification
NEXTEND =                    3 / Number of standard extensions
DATE    = '2009-09-25T21:12:50' / date this file was written (yyyy-mm-dd)
FILENAME= 'j9du03b3q_drz.fits' / name of file
FILETYPE= 'SCI      '          / type of data found in data file

TELESCOP= 'HST'                / telescope used to acquire data
INSTRUME= 'ACS   '             / identifier for instrument used to acquire data
EQUINOX =               2000.0 / equinox of celestial coord. system

              / DATA DESCRIPTION KEYWORDS

ROOTNAME= 'j9du03b3q'          / rootname of the observation set
IMAGETYP= 'EXT               ' / type of exposure identifier
PRIMESI = 'ACS   '             / instrument designated as prime

              / TARGET INFORMATION

TARGNAME= 'JUPITER3                       ' / proposer's target name
RA_TARG =   2.259050923144E+02 / right ascension of the target (deg) (J2000)
DEC_TARG=  -1.592159661850E+01 / declination of the target (deg) (J2000)

              / PROPOSAL INFORMATION

PROPOSID=                10507 / PEP proposal identifier
LINENUM = '03.001         '    / proposal logsheet line number
PR_INV_L= 'Grodent                        ' / last name of principal investigator
PR_INV_F= 'Denis               ' / first name of principal investigator
PR_INV_M= '                    ' / middle name / initial of principal investigat

              / EXPOSURE INFORMATION

SUNANGLE=           138.593323 / angle between sun and V1 axis
MOONANGL=           109.851707 / angle between moon and V1 axis
SUN_ALT =           -16.545755 / altitude of the sun above Earth's limb
FGSLOCK = 'FINE                ' / commanded FGS lock (FINE,COARSE,GYROS,UNKNOWN)
GYROMODE= '2'                  / number of gyros scheduled for observation
REFFRAME= 'GSC1    '           / guide star catalog version

DATE-OBS= '2006-03-27'         / UT date of start of observation (yyyy-mm-dd)
TIME-OBS= '09:01:53'           / UT time of start of observation (hh:mm:ss)
EXPSTART=       53821.37630852 / exposure start time (Modified Julian Date)
EXPEND  =       53821.37753111 / exposure end time (Modified Julian Date)
EXPTIME =                105.0 / exposure duration (seconds)--calculated
EXPFLAG = 'NORMAL       '      / Exposure interruption indicator
```

HST (Re-Re-) Archiving

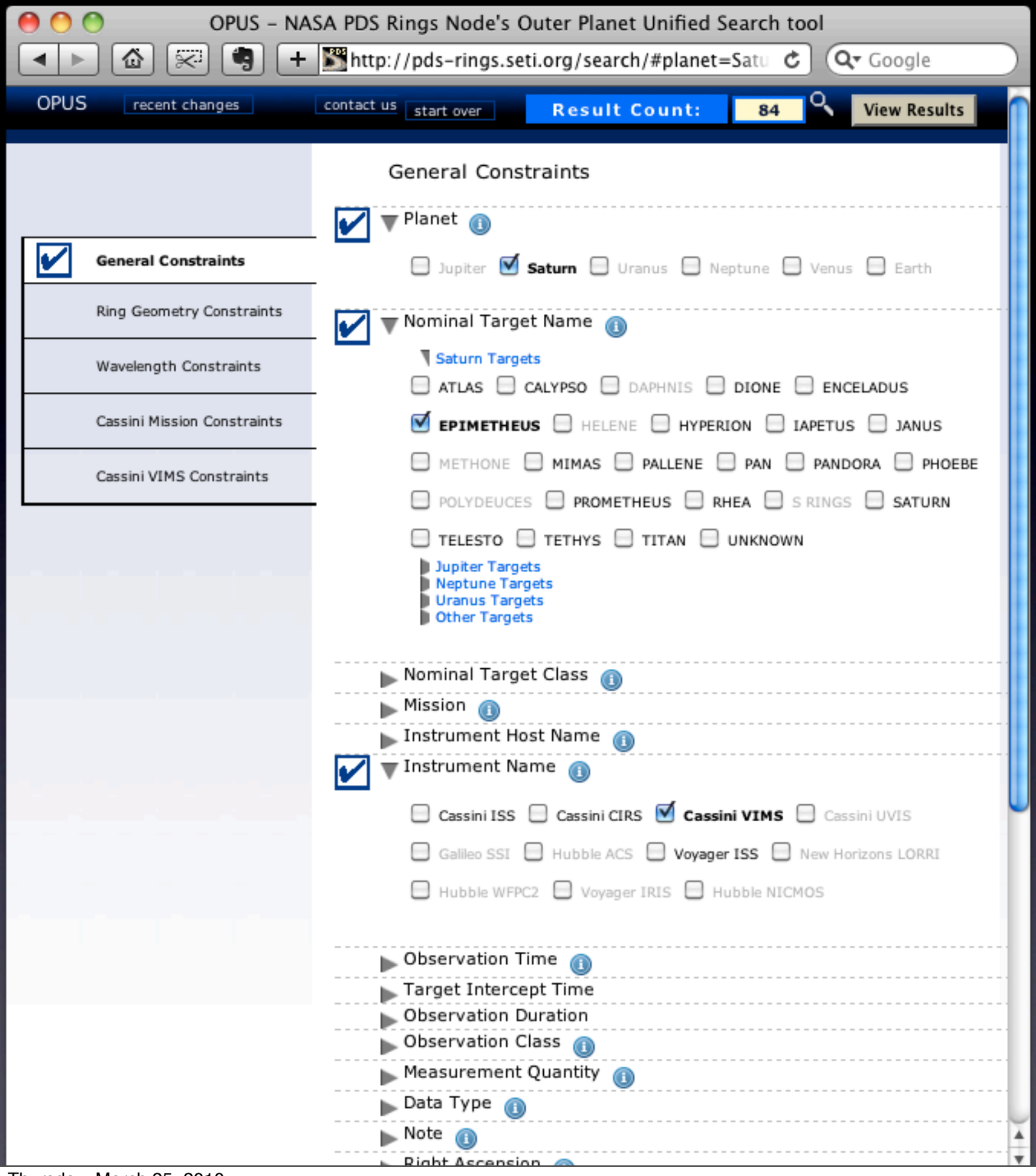
- Our Solution:
  - Every HST observation is now a DOCUMENT object.
  - The document includes TIFFs and JPEGs of the images (but not the FITS files).
  - The document contains all the FITS header parameters from the files.

OPUS Development

"Outer Planets Unified Search"

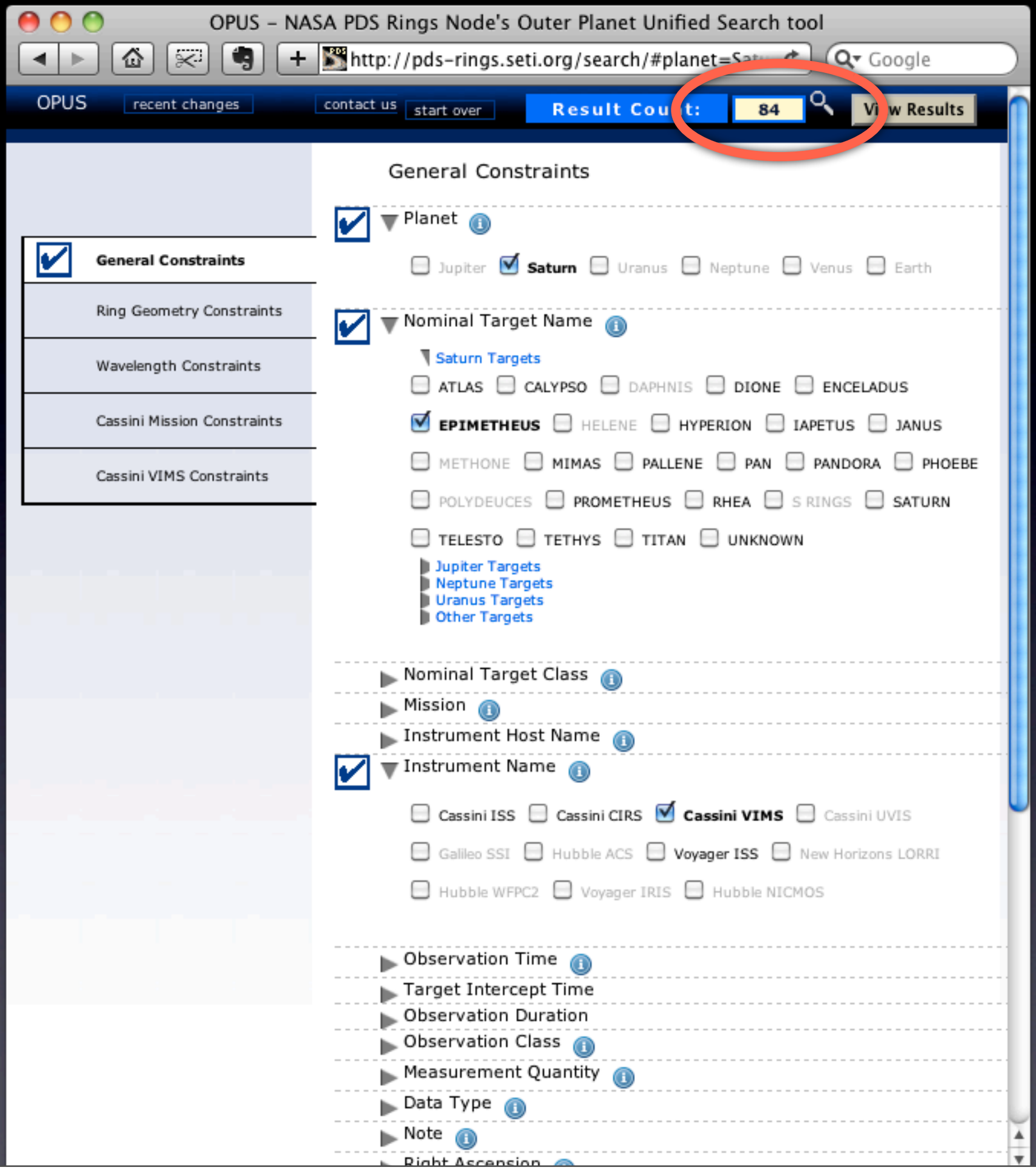


- We remain current with Cassini deliveries
- Most recent changes are "under the hood"
  - Performance issues
  - REST-ful interface



OPUS

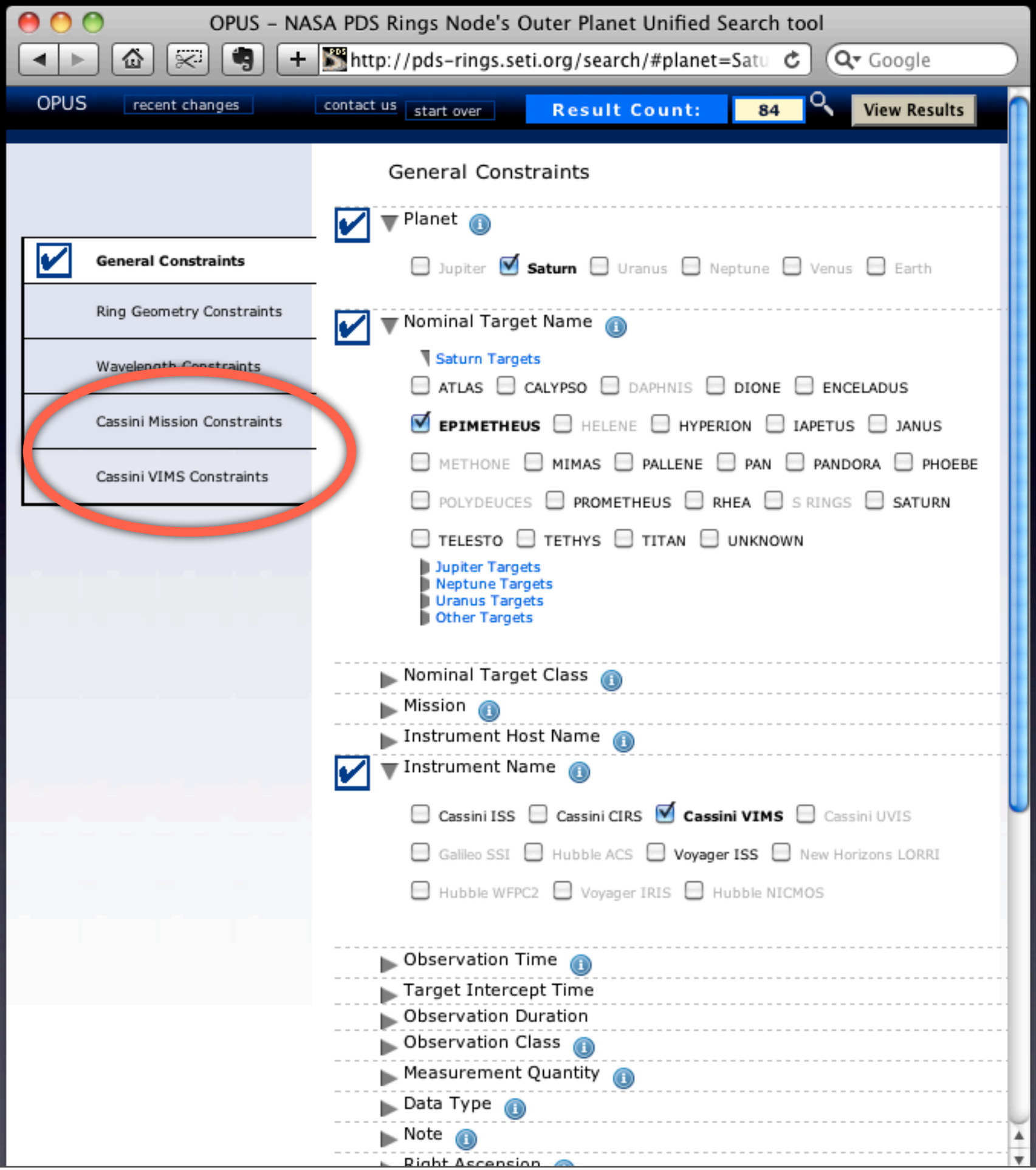
On every user click...



OPUS

On every user click...

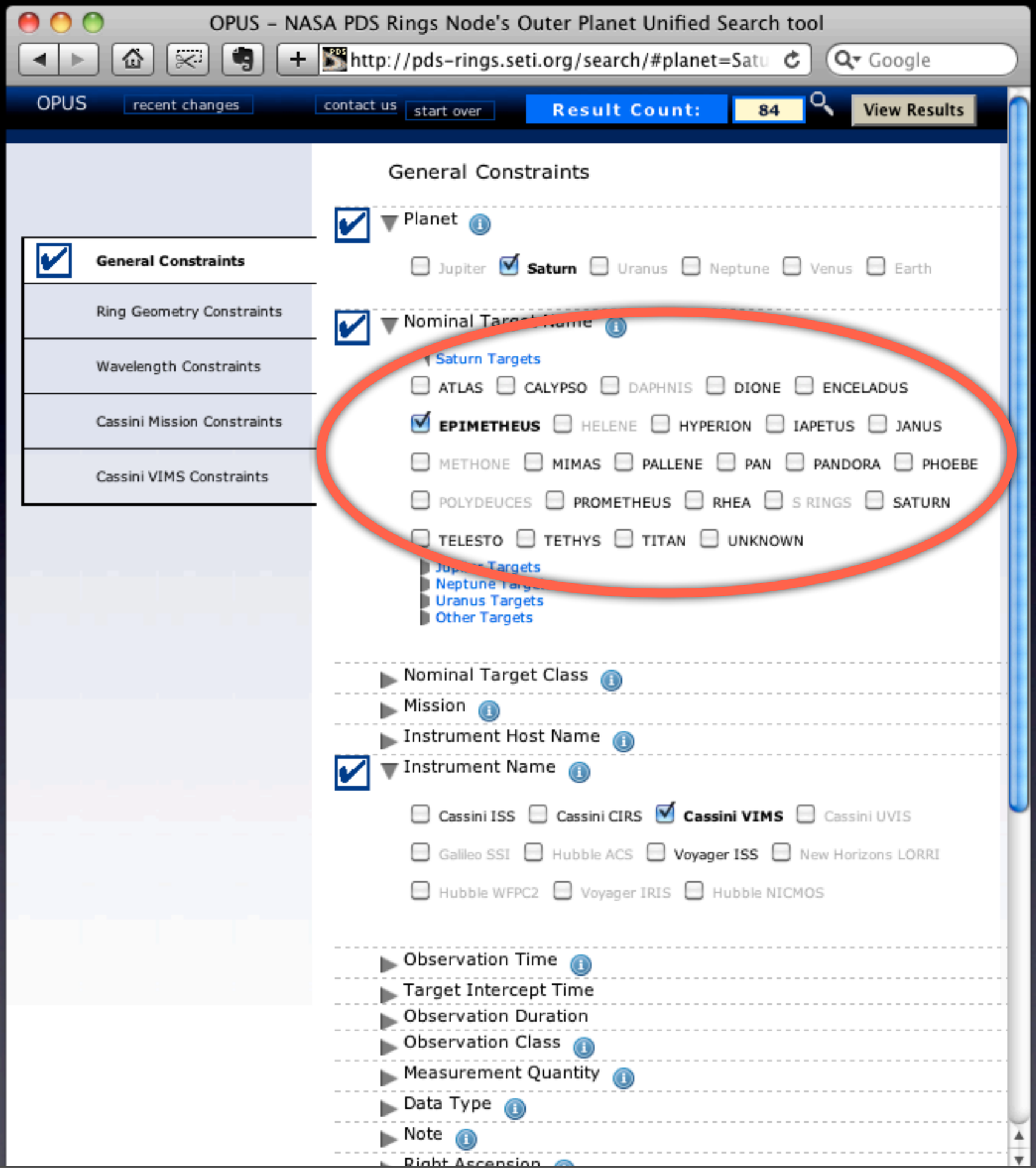
- The result count updates.



OPUS

On every user click...

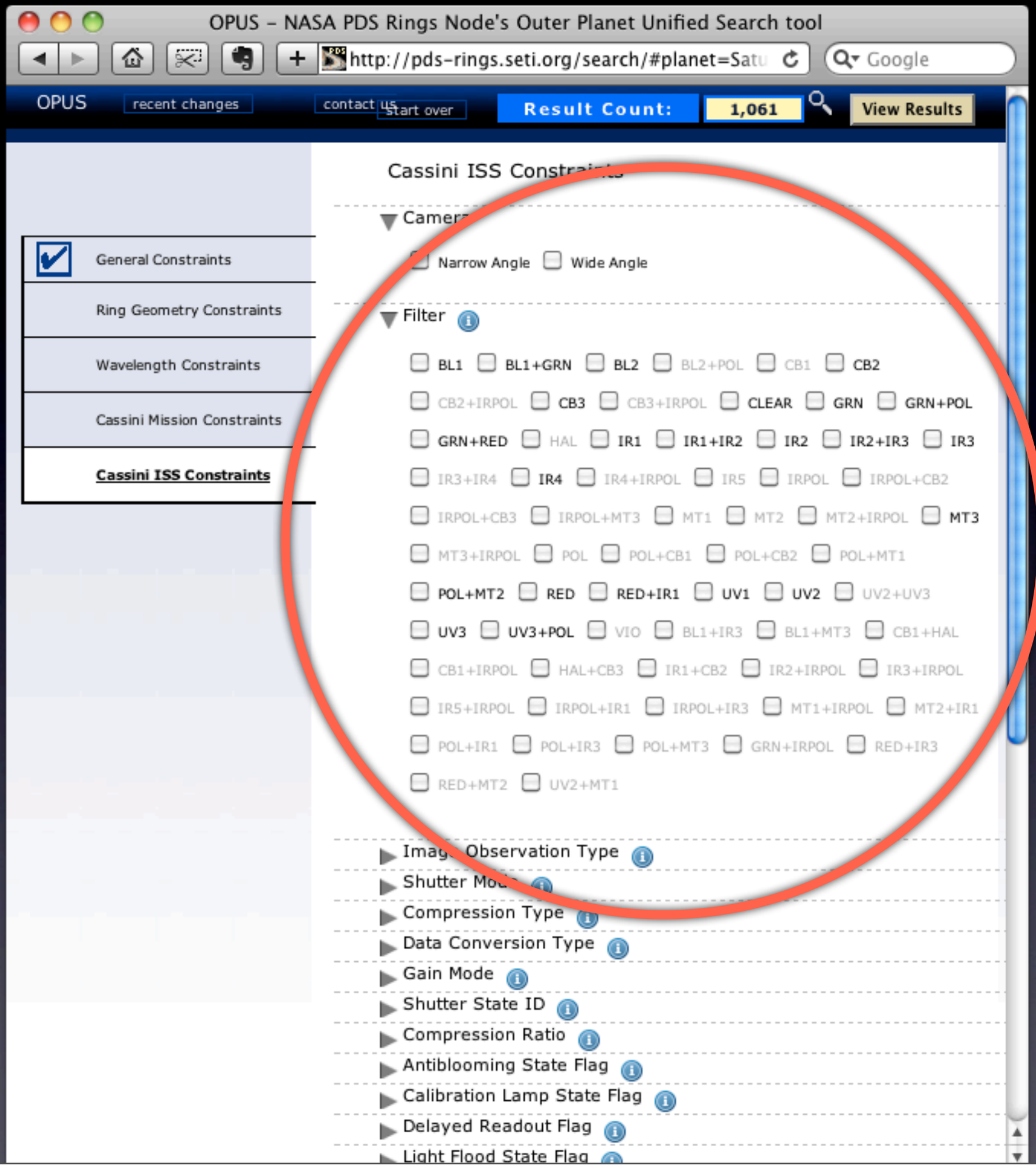
- The result count updates.
- The tab selection updates.



OPUS

On every user click...

- The result count updates.
- The tab selection updates.
- Remaining options that would return no hits turn gray.



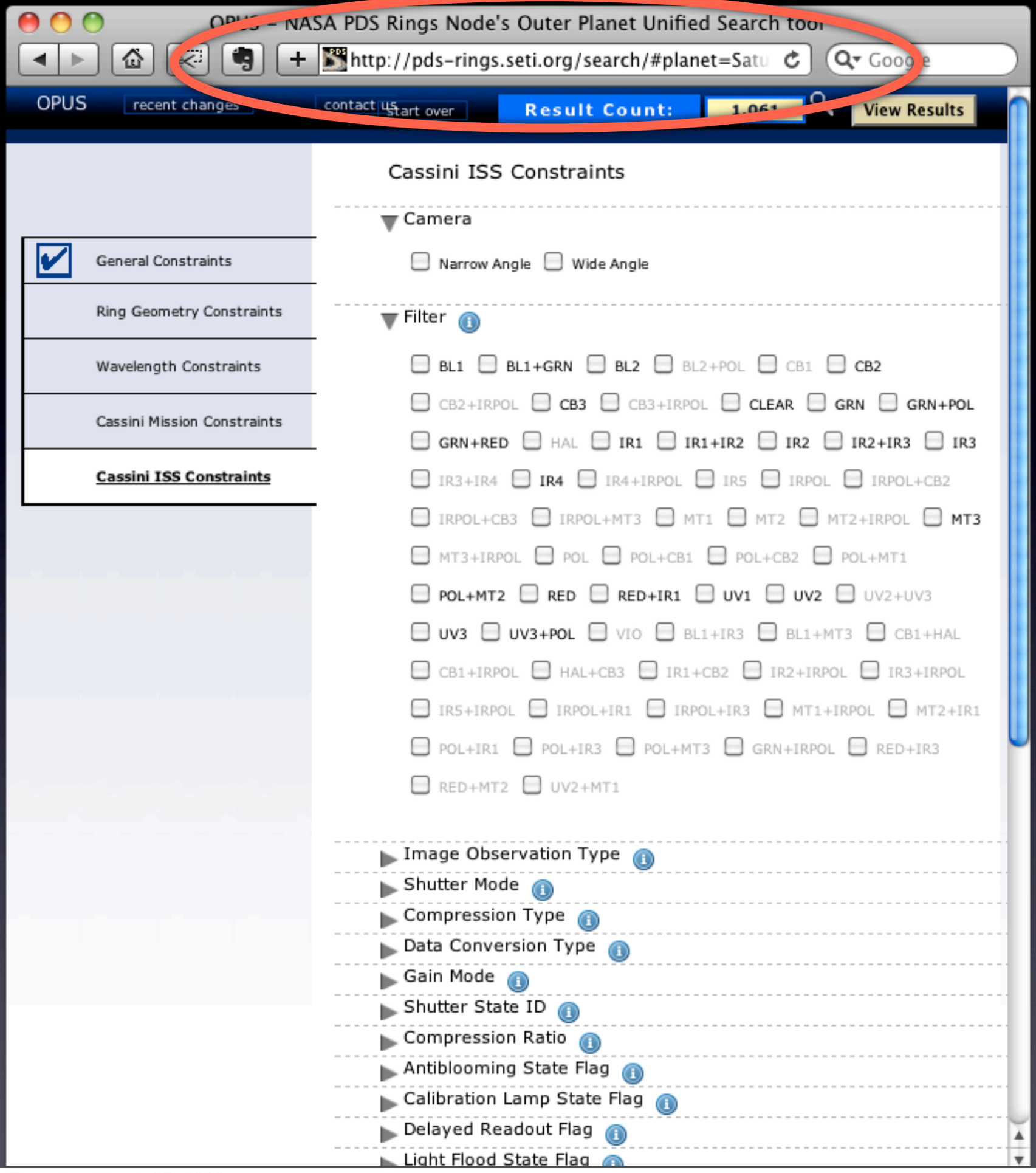
"Asynchronous Communication"

The advantage:

- The user gets immediate feedback about available data when exploring.
- Users like it.

The disadvantage:

- Our server has to handle potentially dozens of queries on the database all at once.



REST-ful URLs

http://pds-rings.seti.org/search/

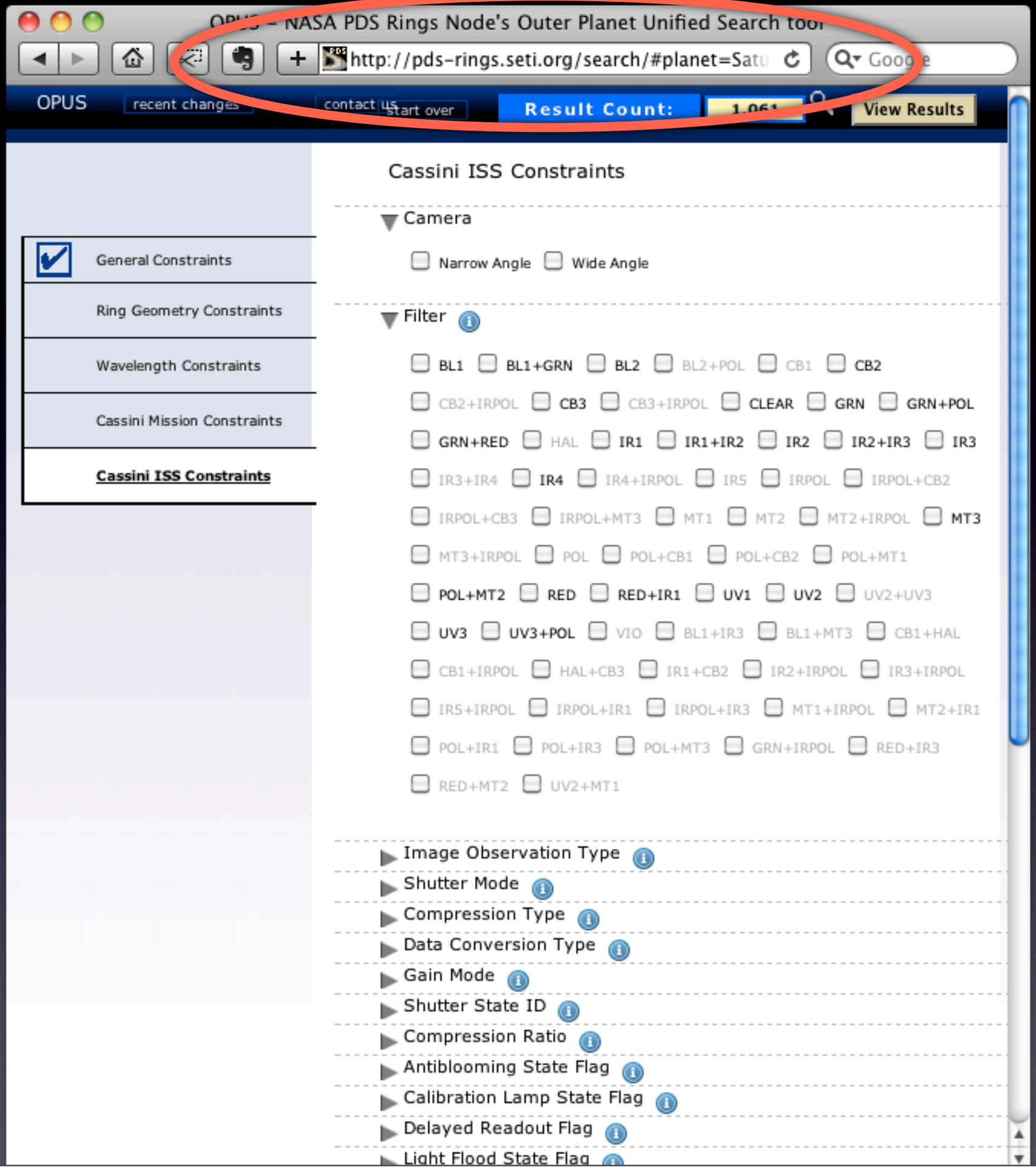
#planet = Saturn

&target = EPIMETHEUS

&instrumentid = Cassini+ISS

&tab = obs_instrument_COISS

&open = planet, target, instrumentid, FILTER, camera

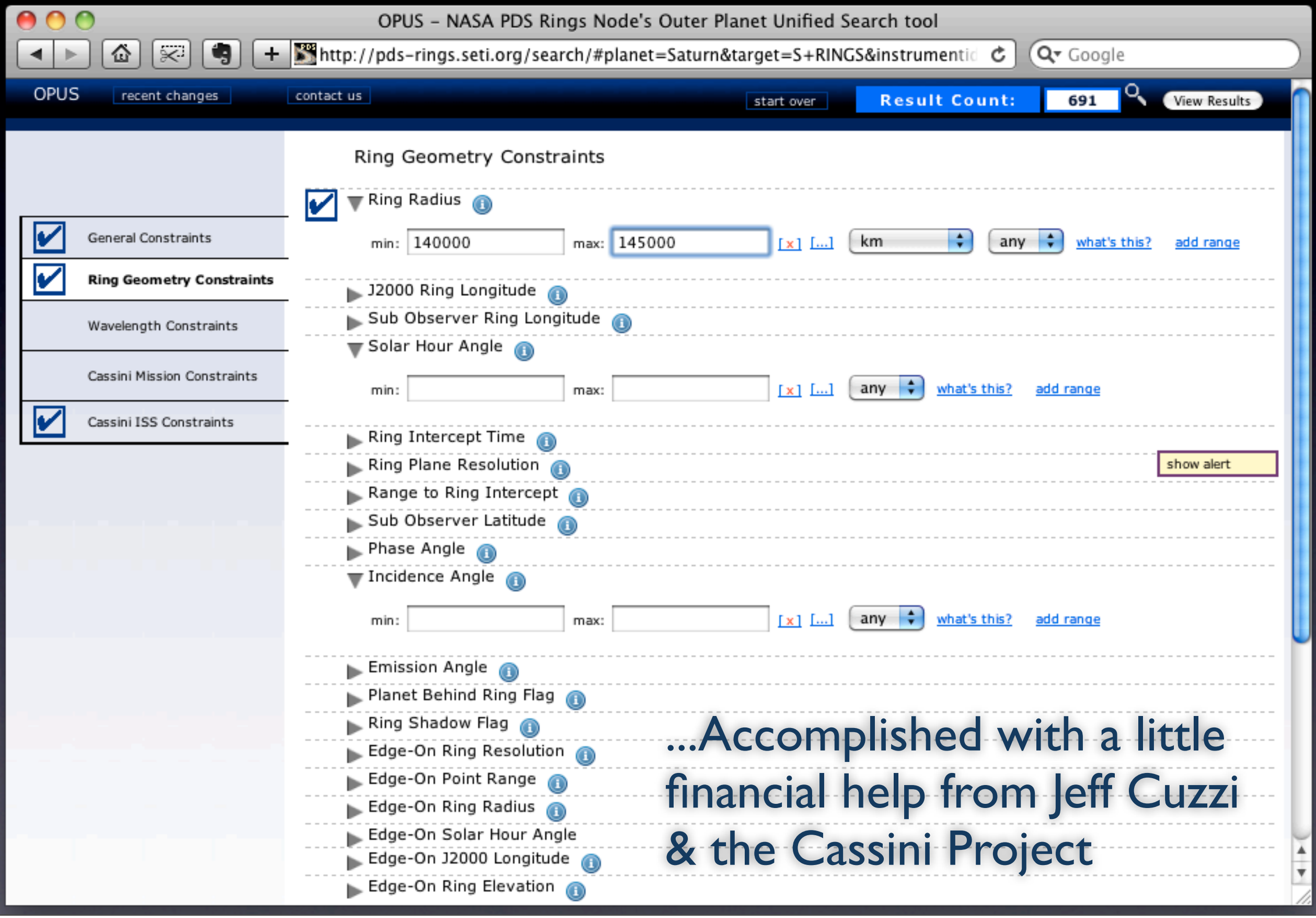


REST-ful URLs

The advantage:

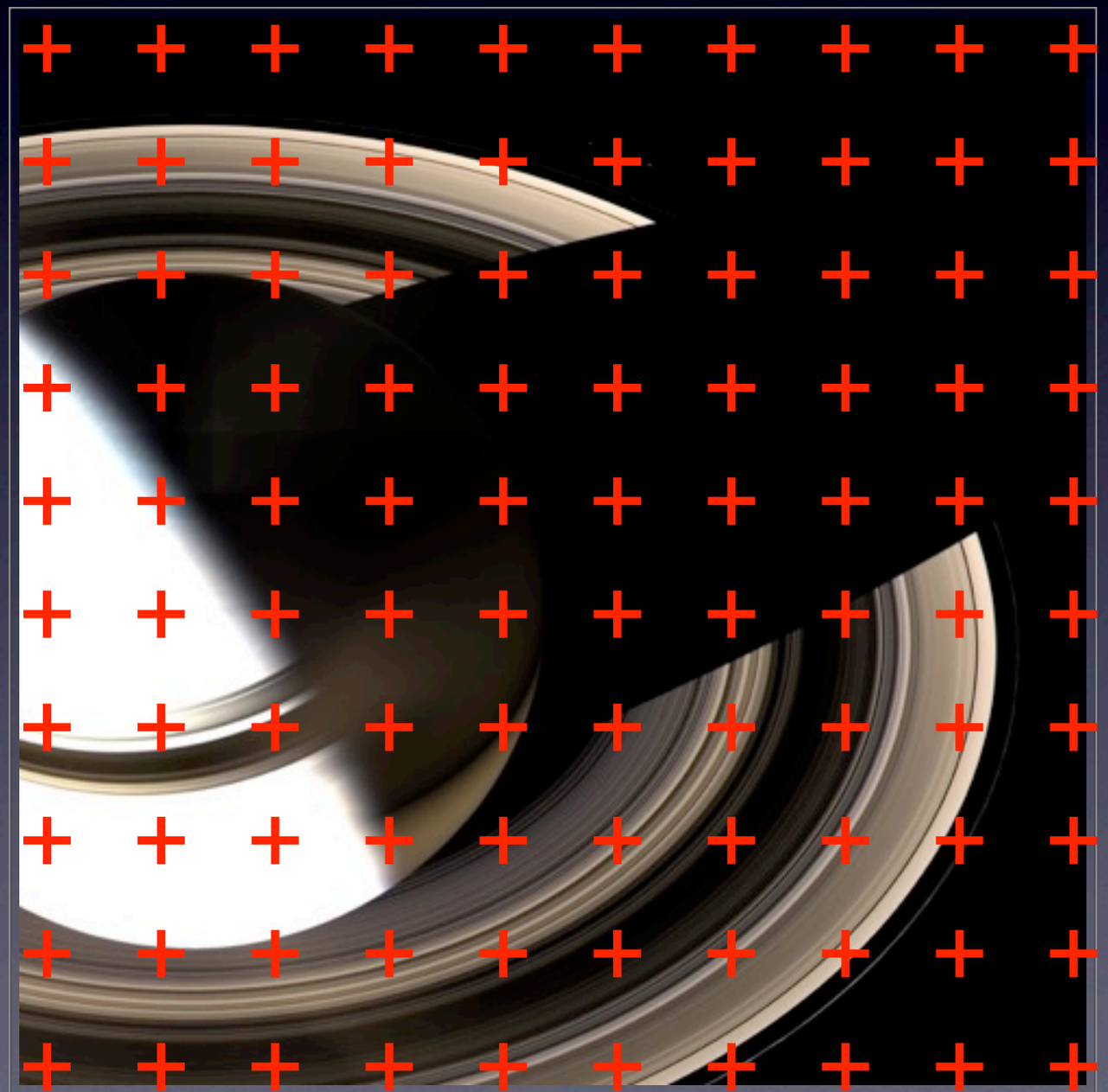
- This begins the decoupling of the user interface from the search service.
- You can bookmark any step in a search.
- ANYBODY can create a web-based tool that accesses our service.

Geometric Metadata



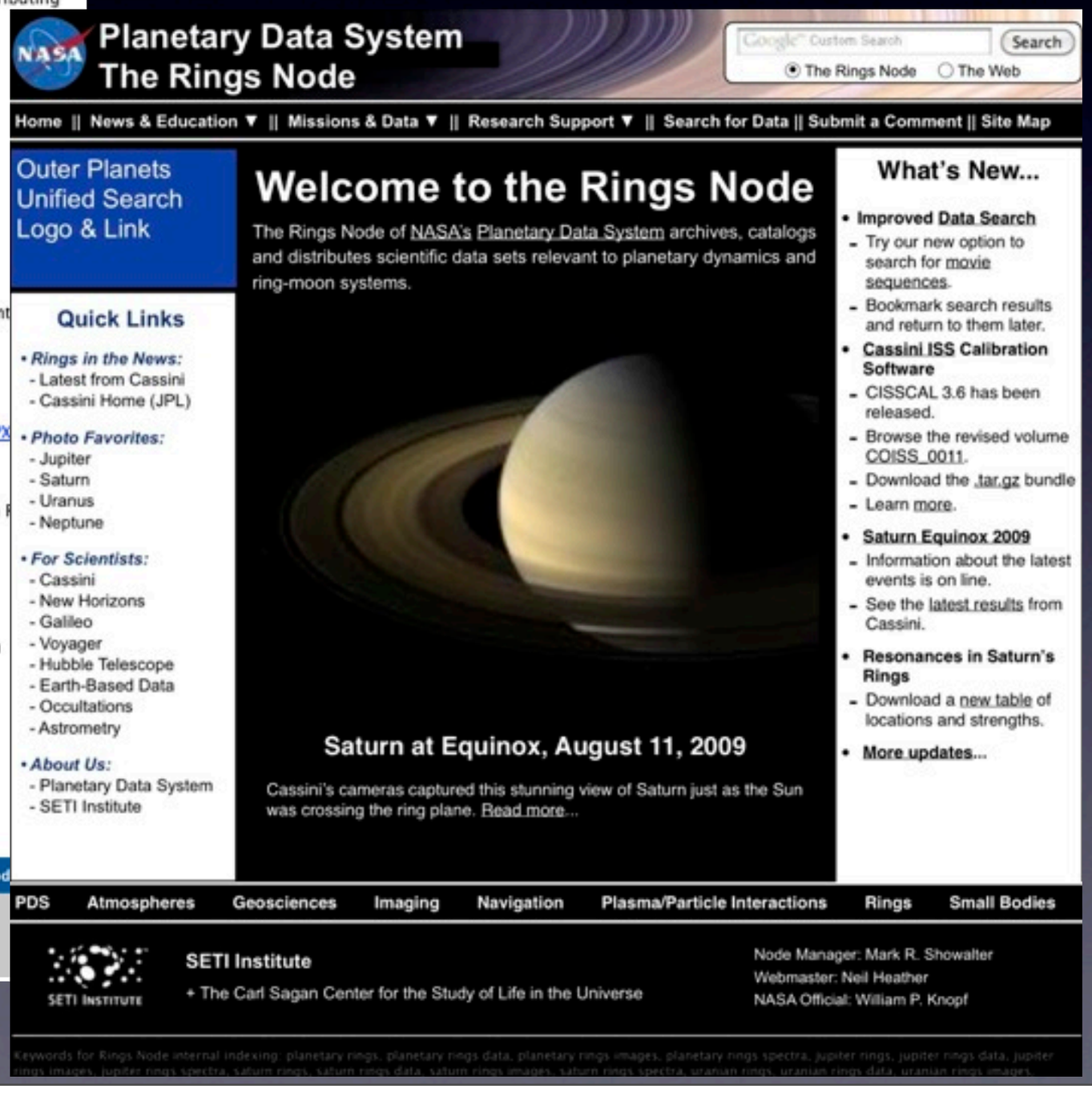
...Accomplished with a little financial help from Jeff Cuzzi & the Cassini Project

...based on a fine sampling of the entire field of view



Web Site Re-design...

Mock-ups and discussions are in progress



OPUS: Outer Planets Unified Search

Quick Start Page

Click any relevant boxes, watch the observation count at right, then click “Go!” to see results.

OPUS Help
Update & change history
Submit a comment/report a bug

Target Requirements:

Planet:
- ☑ Jupiter
- ☐ Saturn
- ☐ Uranus
- ☐ Neptune

Target type:
- ☐ Planet
- ☐ Ring
- ☑ Moon
- ☐ Star
- ☐ Sky
- ☐ Other

...or enter a target name:

...or select target from list

Data Source:

From mission:
- ☐ Cassini
- ☐ Earth-based Telescope
- ☑ Galileo
- ☐ Hubble Telescope
- ☐ New Horizons
- ☐ Voyager

Instrument type:
- ☑ Camera
- ☐ Near-IR Spectrometer
- ☐ Thermal IR Spectrometer
- ☐ UV Spectrometer
- ☐ High-Speed Photometer

...or select mission & instrument name from list...

Measurement Needs:

Measurement quantity:
- ☐ Intensity or reflectivity
- ☐ Opacity

Spatial sampling type:
- ☐ Profiles (1-D)
- ☐ Images (2-D)
- ☐ Extended 2-D (“mosaics”)

Wavelength band:
- ☐ Visual
- ☐ Near IR
- ☐ Thermal IR
- ☐ Radio
- ☐ UV

Wavelength sampling type:
- ☐ Detailed (“spectra”)
- ☐ Limited (“color”)

Timespan:
- ☐ Minutes (“movies”)
- ☐ Days
- ☐ Years

Time sampling:
- ☐ Minutes
- ☐ Hours
- ☐ Days

I would also like to limit my search further based on...
- ☐ Subregion on the target and/or spatial resolution
- ☐ Lighting and viewing geometry on the target
- ☐ Wavelength and bandpass
- ☐ Time limits and duration
- ☐ Mission- and instrument-specific parameters

Refine query further...

Result Summary

Observation count: 3202

Show me my results

Break down results by...

Target name ▼

Adrastea	5
Amalthea	4
Io	104
Europa	1202
Ganymede	877
Callisto	1010

Instrument ▼

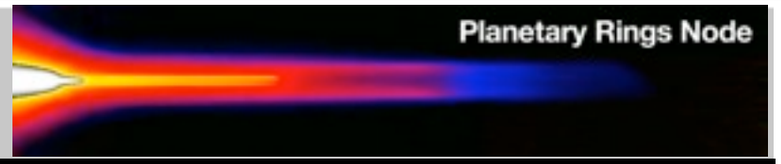
Galileo SSI	3202

Select... ▼

Thursday, March 25, 2010

Planetary Data System
The Rings Node

- NASA Portal
- Site Help
- Feedback



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OPUS: Outer Planets Unified Search

OPUS Help
Update & change history
Submit a comment/report a bug

Query | Results & Collections | Closer Look

General...
- [x] Basics
- [ ] Ring Geometry
- [x] Surface Geometry

Sampling...
- [ ] Spatial 2-D (images)
- [x] Spatial 1-D (profiles)
- [x] Time (movies)
- [ ] Wavelength (spectra)

Mission...
- [ ] Cassini
- [x] Earth-based
- [ ] Galileo
- [x] Hubble Telescope
- [ ] New Horizons
- [x] Pioneer
- [ ] Voyager

Instrument...
- [ ] Cassini CIRS
- [ ] Cassini ISS
- [ ] Cassini VIMS
- [ ] Galileo SSI
- [ ] NH LORRI
- [ ] Voyager ISS

General > Basic Parameters

Open All || Close All || Clear Page || Start Over

- [ ] ▼ **Planet**
  - [ ] Jupiter [ ] Saturn [ ] Uranus [ ] Neptune
- [ ] ▶ **Target type**
- [ ] ▶ **Target name**
- [ ] ▶ **Mission**
- [ ] ▶ **Instrument type**
- [ ] ▶ **Instrument name**
- [ ] ▶ **Measurement quantity**
- [ ] ▶ **Spatial sampling type**
- [ ] ▶ **Observation time**
- [ ] ▶ **Observation duration**
- [ ] ▶ **Observation ID**

Define term

Reset
Suspend
Restore

Show valid range
Quick picks
Add range

[ ] **Show Advanced Options...**

Result Summary

Observation count: Pending
Show me my results

Break down results by...

Select... ▼

PDS | Atmospheres | Geosciences | Imaging | Navigation | Plasma/Particle Interactions | Rings | Small Bodies

SETI Institute

Node Manager: Mark R. Showalter

Web Site “Facelift”

- Goals: Ease of use, ease of maintenance, consistency, user appeal, compatibility with other nodes
- Standardized page templates and a Content Management System

Node Internal Matters

- We're adopting Python/Django in a big way.
- Compared to equivalent C or FORTRAN, many codes are ~ 10 x shorter.
    - There's a library for everything!
- In-house development includes a CSPICE interface and a PDS3 label parser.
- It's FREE.
    - cf. IDL license fees.

Coming Soon...

SETI Institute will be relocating this summer.